Visualization of Hajime Yoshino’s Logical Jurisprudence

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Based on:

• Friedrich Lachmayer’s slides
  - 2007, presentation at KEIO University, Tokyo
  - 24.11.2016, Austrian Parliament
    - in connection with Legal Framing 2016

• Hajime Yoshino’s slides and papers
  - IRIS 2007, 22.2.2007, Salzburg
  - 11th ICAIL 2007, Stanford
  - 13th ICAIL 2011
  - ...
  - Legal Framing, 23.11.2016, Vienna
Introduction to the Visualisation-Schemata

State Law

Legal Science, Jurisprudence

Stage of Rights and Duties

Scientific Audience, Applications
Metalevel

State, Law

Constitution

Legal Hierarchy

indiv. Judgements

Kelsen

Basic Norm

Jurisprudence

Stage of Rights and Duties

Scientific Audience
Metalevel

State, Law

Logic

Yoshino

Scientific

Logical Sentences

Stage of Rights and Duties

Scientific Audience
Metalevel

Introduction

Logic

Yoshino

Scientific Logical Sentences

Computer Expert Systems

Scientific Audience

State, Law

Stage of Rights and Duties

Applications

Applications
Logical Jurisprudence
Metalevel

State, Law

whole Legal System

try to analyze and explain

LJ - Logical Jurisprudence

Logical Jurisprudence

Stage of Rights and Duties

Scientific Audience
LJ tries to analyse and construct its scientific theory of law with minimum simple frames like classical physics did.
Three Primitives

LJ tries to analyse and explain the whole legal system using minimum elements.
Metalevel

State, Law

LJ - Logical Jurisprudence

Three Primitives:

1. **S Sentence**
2. **V Validity**
3. **Inference Rule**
   - *Modus Ponens*

Stage of Rights and Duties

Scientific Audience
LJ

Starts form three primitives:

(1) “sentence”
   • LJ considers that norm as a meaning does not exist.
   • LJ starts from sentences.

(2) “validity” of sentence
   • Legal validity as truth
     “is_valid(sentence1, goal1, time1)”

(3) “inference rule”
   • Modus ponens:  P, P ⇒ Q  |-  Q
Three Types of Legal Sentences
LRS
Legal Rule Sentence

describes
Legal Rules
LS – Legal Sentence

LJ starts from Legal Sentences not Legal Norms
LJ deals with Legal Sentences but not Legal Norms (as meanings which do not exist in reality)
Legal rule sentences and fact sentences
LFS

Legal Fact Sentence

describes

Legal Facts
describes Legal Objects, especially Obligations
Metalevel

State, Law

LJ - Logical Jurisprudence

Legal Object Sentence

Legal Role

LO Legal Object
Obligation

Legal Role

Stage of Rights and Duties

Scientific Audience
Legal Meta Sentence describes about the validity of legal sentences
State, Law

Stage of Rights and Duties

Scientific Audience

LMS
Legal Meta Sentence
describes
validity
LS
Legal Sentence
ELS
Elementary Legal Sentence

*is the smallest unit of legal sentences.*

“One must drive a car under 100 km /hour on a highway”
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ELS

smallest unit

of Legal Sentences

Stage of Rights and Duties

Scientific Audience
Structure of Connection of Legal Sentences

(1) Connective “And” (&)
(2) Connection in a Complex Sentence
(3) Connection of LOS with LMS
(4) Connection of LMS with LMS
Structure of Connection of LS: (1)

“And” structure of the connection of LS
State, Law

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a group of LS which has an unique name

Stage of Rights and Duties

Scientific Audience
Structure of Connection of LS: (2)

Connection in Complex Sentence
CLS

Complex Legal Sentence

includes Legal Sentences
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LJ - Logical Jurisprudence

a group of LS

which has an unique name

Stage of Rights and Duties

Scientific Audience
Structure of Connection of LS: (3)

Connection of LOS with LMS
Metalevel

State, Law

Legal Rules

LJ - Logical Jurisprudence

Legal Facts

Stage of Rights and Duties

Scientific Audience
Legal Rules

represented by

LRS

LFS

Legal Facts

State, Law

LJ - Logical Jurisprudence

Stage of Rights and Duties

Scientific Audience

Metalevel
Legal Rules

IR Inference Rule
Modus Ponens

LRS
proved
validity

LFS

LOS

Legal Facts

Legal Object
Legal State of Affair

State, Law

Stage of Rights and Duties

Scientific Audience
Metalevel

State, Law

Legal Rules

IR Inference Rule

Modus Ponens

proved
validity

LRS

LFS

LOS

Legal Facts

Legal Object

Legal State of Affair

Computer Expert Systems

Stage of Rights and Duties

Scientific Audience
• The legal sentence itself is merely an array of symbols.
• The meaning of a legal sentence only becomes visible when people use it. In other words, the legal inference activates LSs as living legal norms.
• LJ considers the reasoning of the application of law as the process of developing legal sentences.
• The legal reasoning consist of reasoning of justification and reasoning of creation which are related to each other.
Structure of Connection of LS: \((4)\)

Connection of LMS with LMS
FLMRS

Fundamental Legal Meta Rule Sentence
Fundamental legal meta rule sentence – FLMRS

A legal sentence $S$ is valid for a goal $G$ at the time $T$ $\iff$

$S$ becomes valid for $G$ at time $T_1$ before $T$ &
not($S$ is terminated for $G$ after $T_1$ and before $T$).

This is a FLMRS implicitly taken granted for all regulations.

All other (positive) LRS regulate the fulfillment of the first requirement ($S$ becomes valid) or the second requirement ($S$ is terminated) of this rule.
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all Regulations

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FLMRS Fundamental Legal Metarule Sentence

MRS Legal Metarule Sentence

LRS Legal Rule Sentence

Stage of Rights and Duties

Scientific Audience
BLRS
Basic Legal Rule Sentence

→ Validity of the final highest LMS sentence
Final founding the validity LS law through Basic Legal Meta-Rule Sentence

BLMRS

The validity of the final, highest legal meta sentence, whose validity can not be deduce through the application of LMRS sentences, is called the basic legal meta-rule sentence (BLRMS).

The validity of BLMRS is to be presupposed, namely asserted as a fact sentence.
Legal meta-sentences
Comparison of the results of LJ with Kelsen’s PTL
similar solutions at the top of the system
Yoshino

Formal Logic

State, Law

LJ - Logical Jurisprudence

LMS
LRS
LOS
LFS

further supplement of LJ:

→ Legal Ontologies

Stage of Rights and Duties

Computer Expert Systems

Computer-Application
**Outline of the Whole Process of Meta-inference of the Validity**

**Fundamental legal meta sentences**

- \( r0 \) is valid.
- \( r01 \) is valid.
- \( r01 \) is valid.
- \( r01 \) is valid.
- \( r3aa1 \) is valid.
- \( r3aa2 \) is valid.

**Basic Legal Rules \([r01\_bc]\)**

- CISG Part 4 Art. 99 is valid.
- CISG Part 4 Art. 99 (1)
- CISG Part 2 is valid.
- CISG Part 2, Art. 23
- Contract is concluded.
- Contract becomes valid.
- Contract is valid.
- B may require A to repair the machine” is valid on 2010-09-15.

**Positive legal meta sentences**

**Positive legal fact sentences**

- CISG was adopted on 1980-4-10 in Vienna.
- The tenth instruments of ratification was deposited on 1986-12-11.
- Sale of goods between A in New York and B in Osaka.
- B’s acceptance reached to A on 2010-4-9.
- Not proved: beginning time nor condition to enter into force.
- It is not proved: the contract is terminated.
- The machine becomes out of order on 2010-08-10.
- B required A to repair the machine on 2010-09-01.

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**Fundamental Meta rule: \([r01]\)**

- S is valid on \( T \) \( \iff \) S becomes valid & not (S is terminated)

**Contract becomes valid**

- “A must repair the machine” is valid on 2010-09-15.
Summary of LJ

- **Three primitives**: LJ starts from (1) legal sentences, (2) validity as truth, and (3) inference rules and analyses a legal system in terms of 3 types of LSs
- **Systemicity** of law through **legal reasoning**
- Legal system is explained as a **deductive system**
- Clarifies **FLMRS** (fundamental legal meta rules sentences)
- **Inference of validity** between LSs in terms of meta rule sentences and meta inference.
- Developing deductive **legal knowledge bases**.
Conclusions

- **Legal informatics.** Yoshino’s achievement is to stay within the mainstream

- **Ontologies.** We suggest to concern them

- **Compound Legal Formula** representation and Prolog
  - Critique by (Leith 2010) of expert systems

- **Consideration** “Norm as a meaning does not exist” leads to a discussion
  - *Universalia ante rem
    * post rem
    * in rem
  - FRISCO semiotic tetrahedron

![Diagram: FRISCO semiotic tetrahedron](image)
Thank you

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